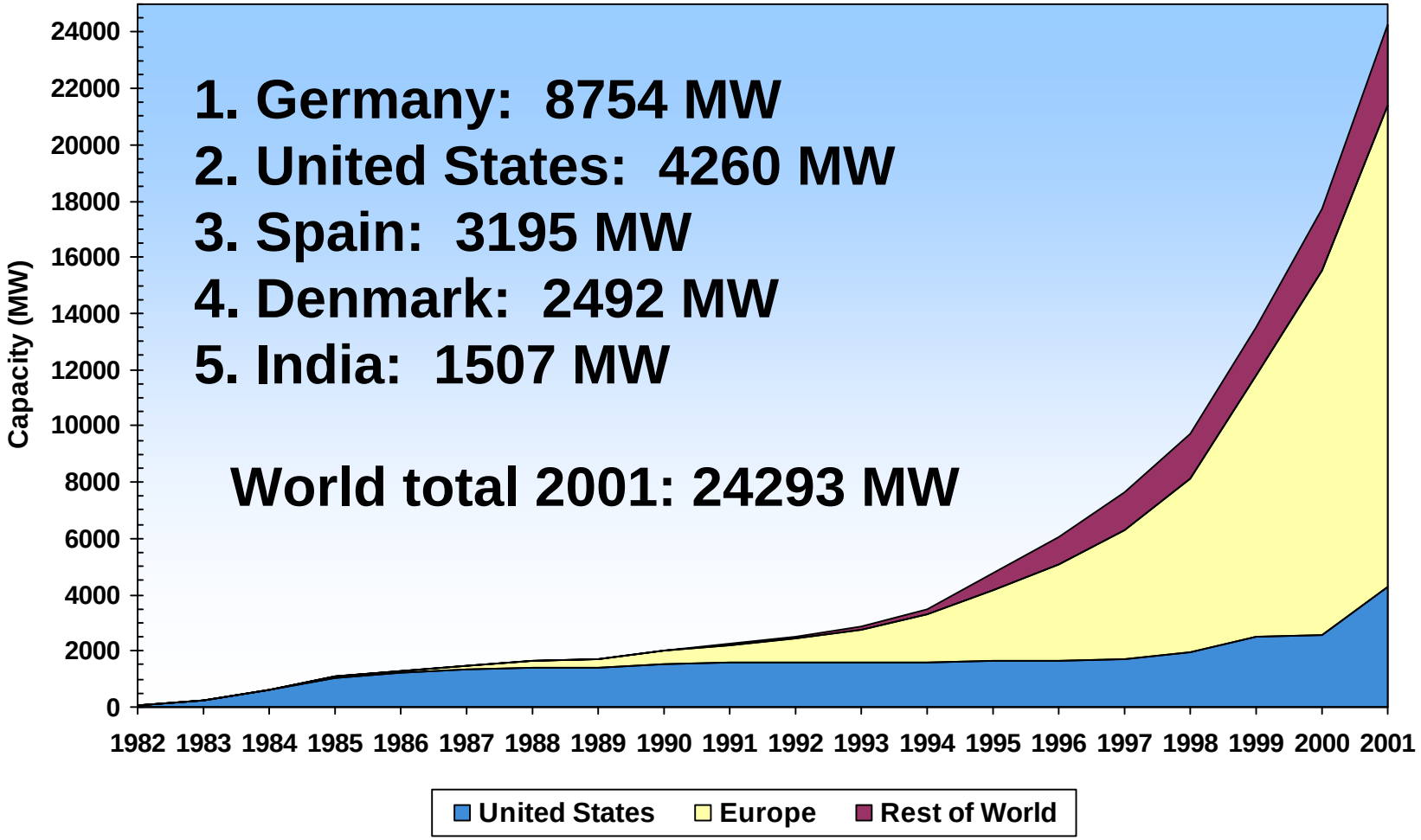
Offshore Wind Energy

OCS Policy
Committee Meeting
May 21, 2002

Peter Goldman
Director, Office of Wind and
Hydropower Technologies
U.S. Department of Energy

World Market Growth

Total Installed Wind Capacity



Source: International Energy Agency

Cost of Wind Energy - U.S.

1979: 80 cents/kWh*

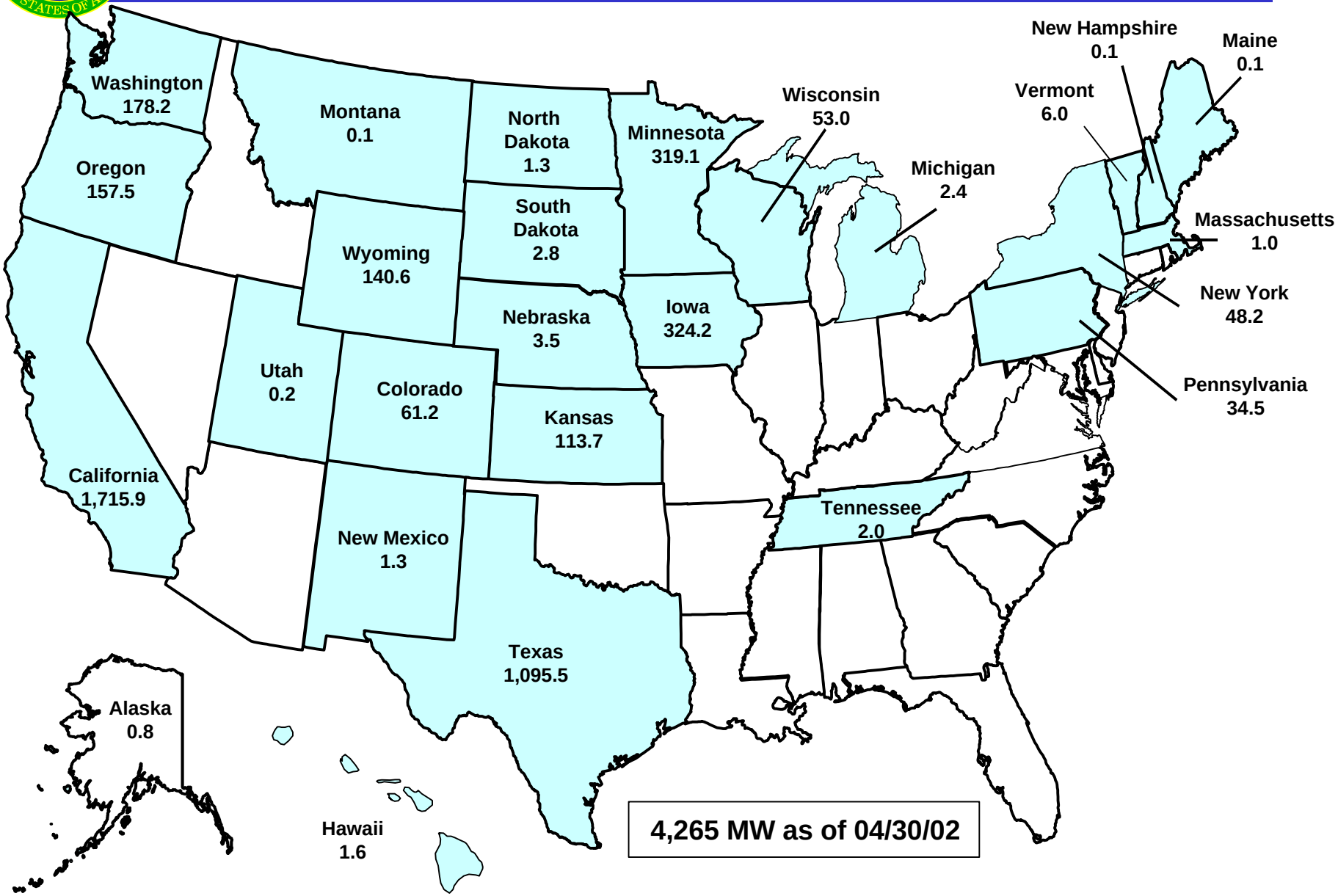
2000:
4 - 6 cents/kWh

- Increased Turbine Size
- R&D Advances
- Manufacturing Improvements

2004:
3 - 5 cents/kWh

*In year 2000 dollars.

United States Wind Power Capacity (MW)



Why Move Offshore?

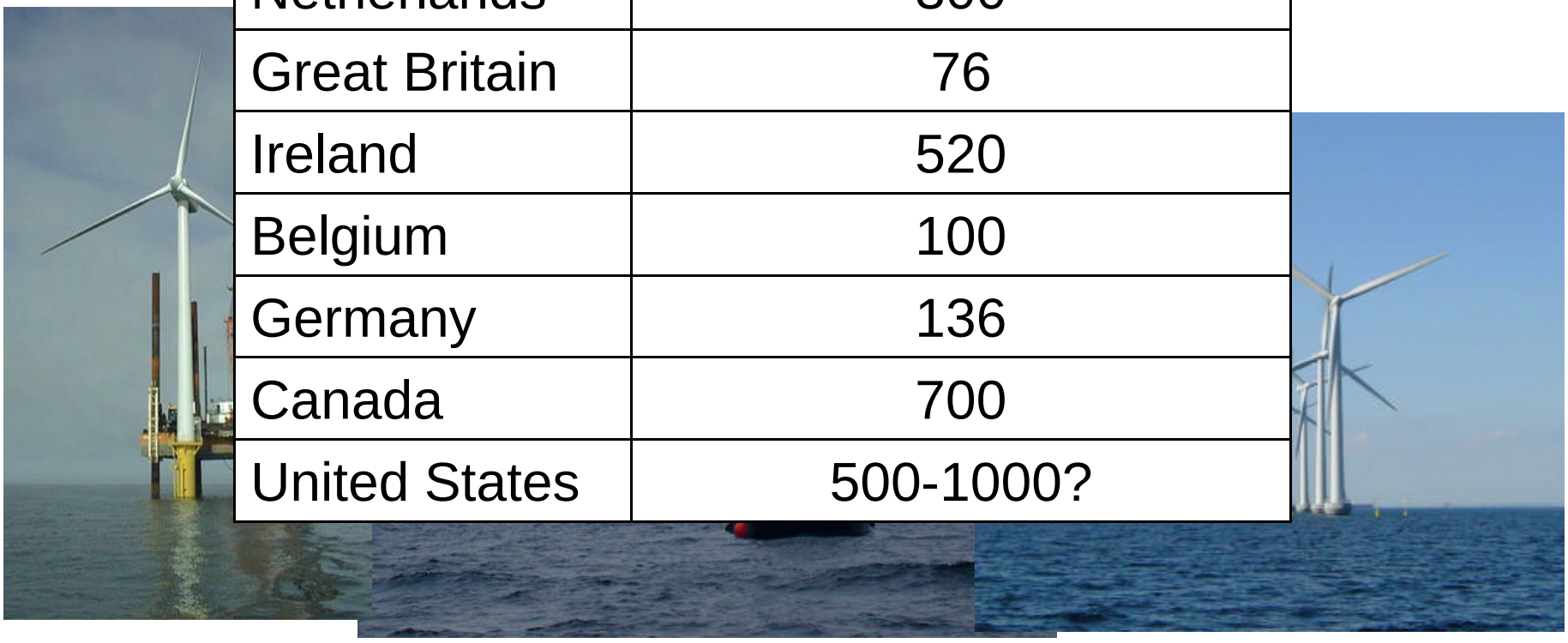
- Higher-quality wind resources
  - Reduced turbulence
  - Increased wind speed
- Economies of scale
  - Avoid logistical constraints on turbine size
- Proximity to loads
  - Many demand centers are near the coast
- Increased transmission options
  - Access to less heavily loaded lines
- Potential for reducing land use and aesthetic concerns

Potential Issues

- Jurisdictional issues – Federal, state, local
- Capital costs
- Increased maintenance costs
  - Service by boat or helicopter
  - Ice damage
  - Corrosion
- Shipping lanes and underwater environment
- Underwater power lines
- Public perception

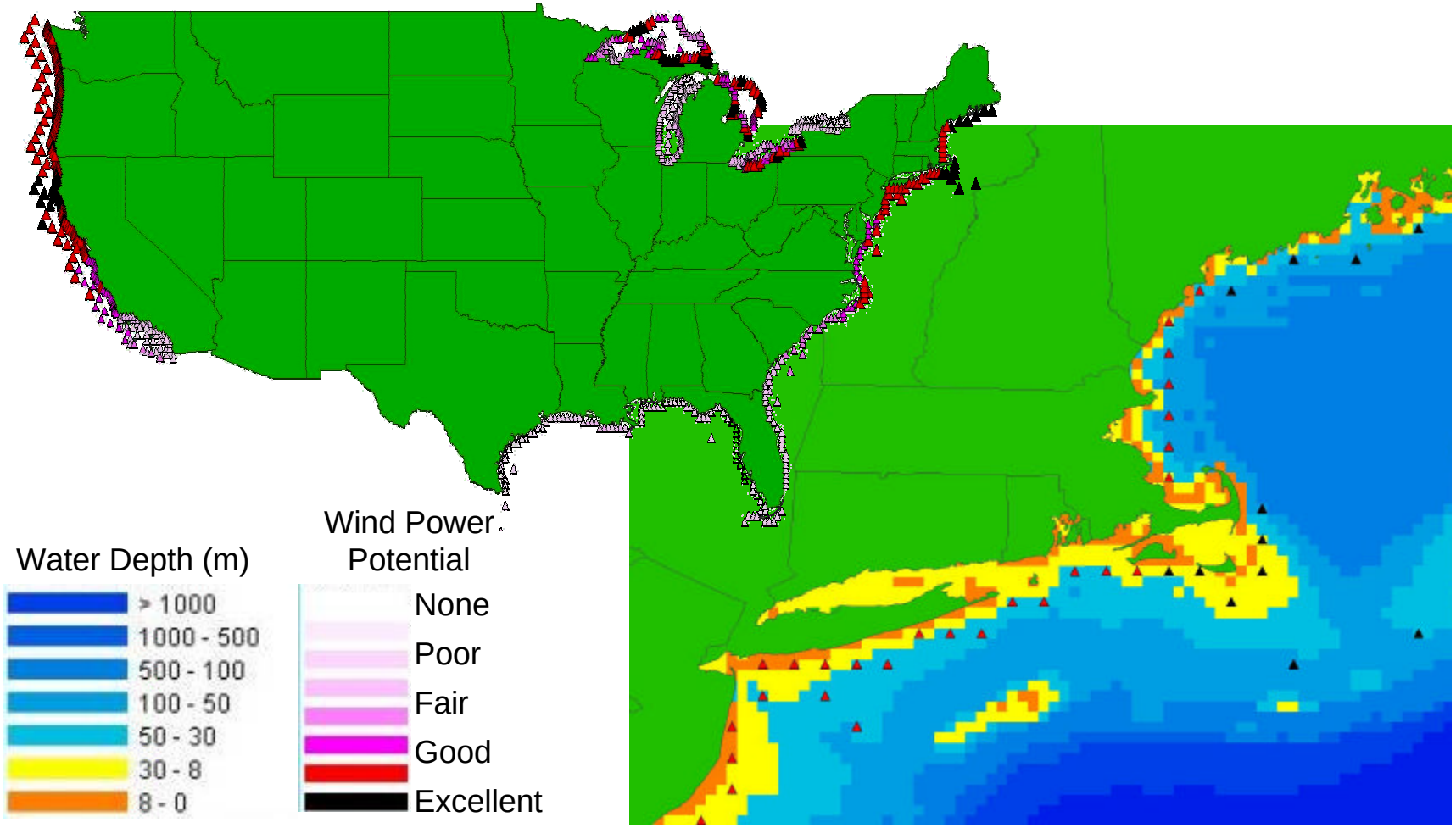
Worldwide Plans

Country	Planned Capacity (MW)
Sweden	52
Denmark	747
Netherlands	300
Great Britain	76
Ireland	520
Belgium	100
Germany	136
Canada	700
United States	500-1000?



Domestic Potential

U.S. offshore resources are concentrated along the Eastern seaboard



Growing Interest in North America

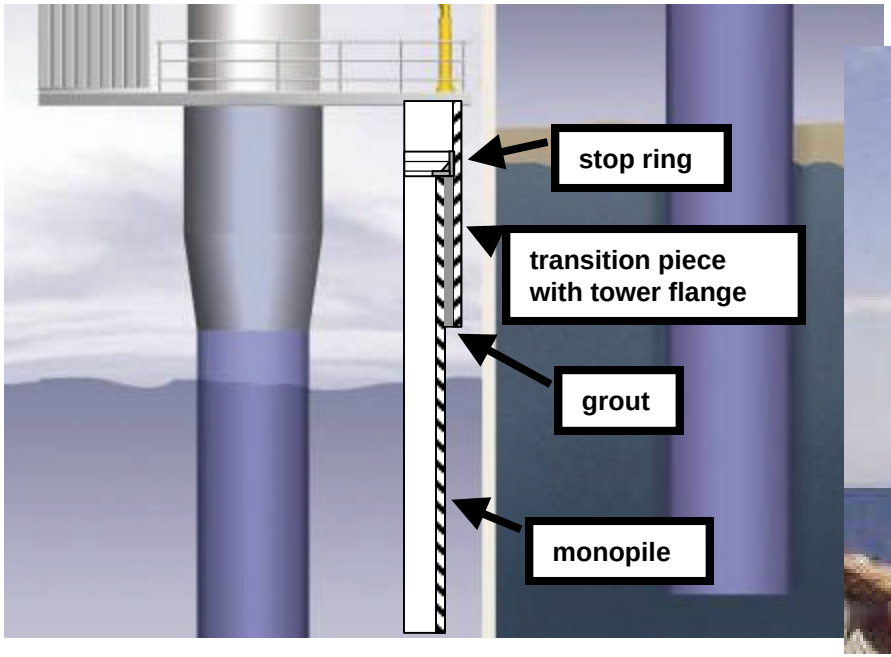
- Cape Cod
  - www.capewind.org
- Long Island
  - www.lipower.org
- New Jersey
  - www.bpu.state.nj.us
- Vancouver, BC

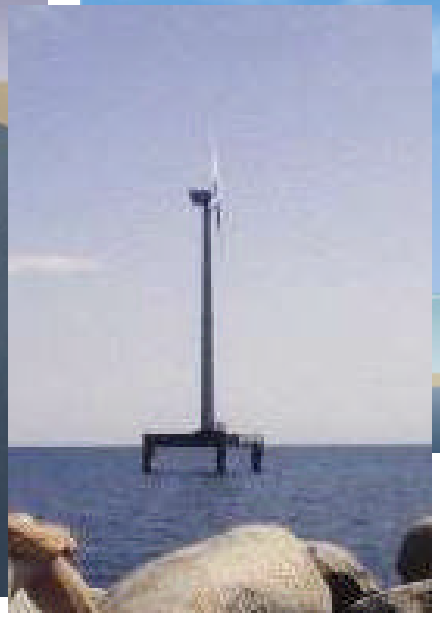
Project Design Considerations

- Resource
- Geographical location
  - Depths up to 15-20 meters
  - Select appropriate foundation for sea bottom
  - Icebreakers on towers if necessary
- Transmission
  - Undersea cables may need to be buried to avoid anchors
- Tower height – blade tips must clear the tallest waves

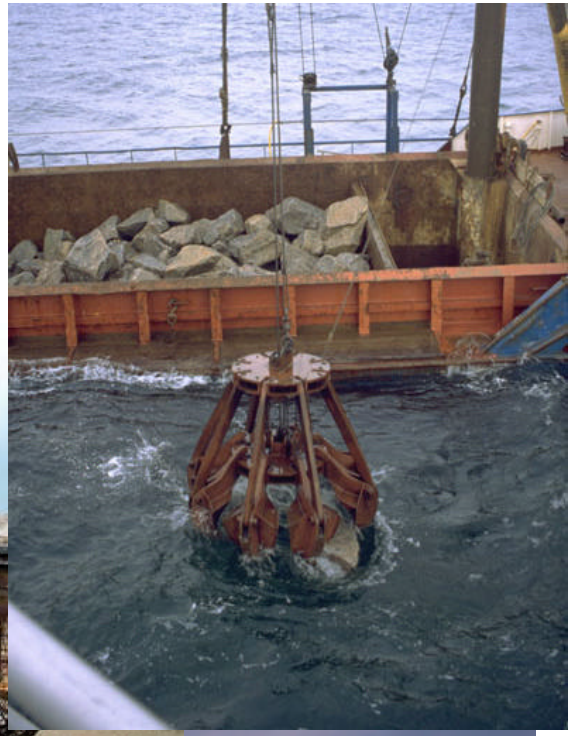
Foundation Designs

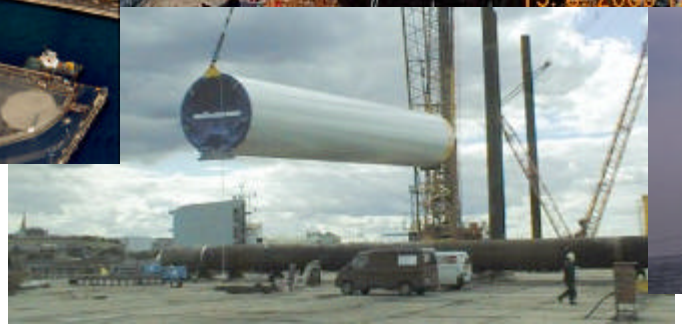
- Monopile
- Caisson
- Tripod





Project Installation





Project Installation